

Abstract

Attention plays a central role in multi-alternative multi-attribute choice [1, 2, 3]. We use a joint experimental and computational approach to investigate the effect of salience driven attention on choice. Using sequential sampling models, we test if salient options receive an initial advantage or if salience affects the process of comparing options during preference accumulation. While we find support for both attention mechanisms for some participants, model comparisons suggest that an initial boost in preference for salient options provides the best accounting of the data. Modeling results also reveal substantial individual differences in the influence of attention on decision-making.

Experimental Design

Participants were recruited using Cloud Research On MTurk.

- N=100 people (96 completed).
- Each Trial had 3 Options with 2 attributes.
- Salience was manipulated with **Color**.
- Complementary Colors were Selected and Randomized for Every Trial.

Each participant did a total of 235 trials.

- 3 Practice Trials
- 96 Attraction Trials – 4 Conditions: 24 trials
- 96 Dominant Trials – 4 Conditions: 24 trials
- 40 Distractor Trials

Experimental methods and analysis was pre-registered. <https://aspredicted.org/3x9hk.pdf>

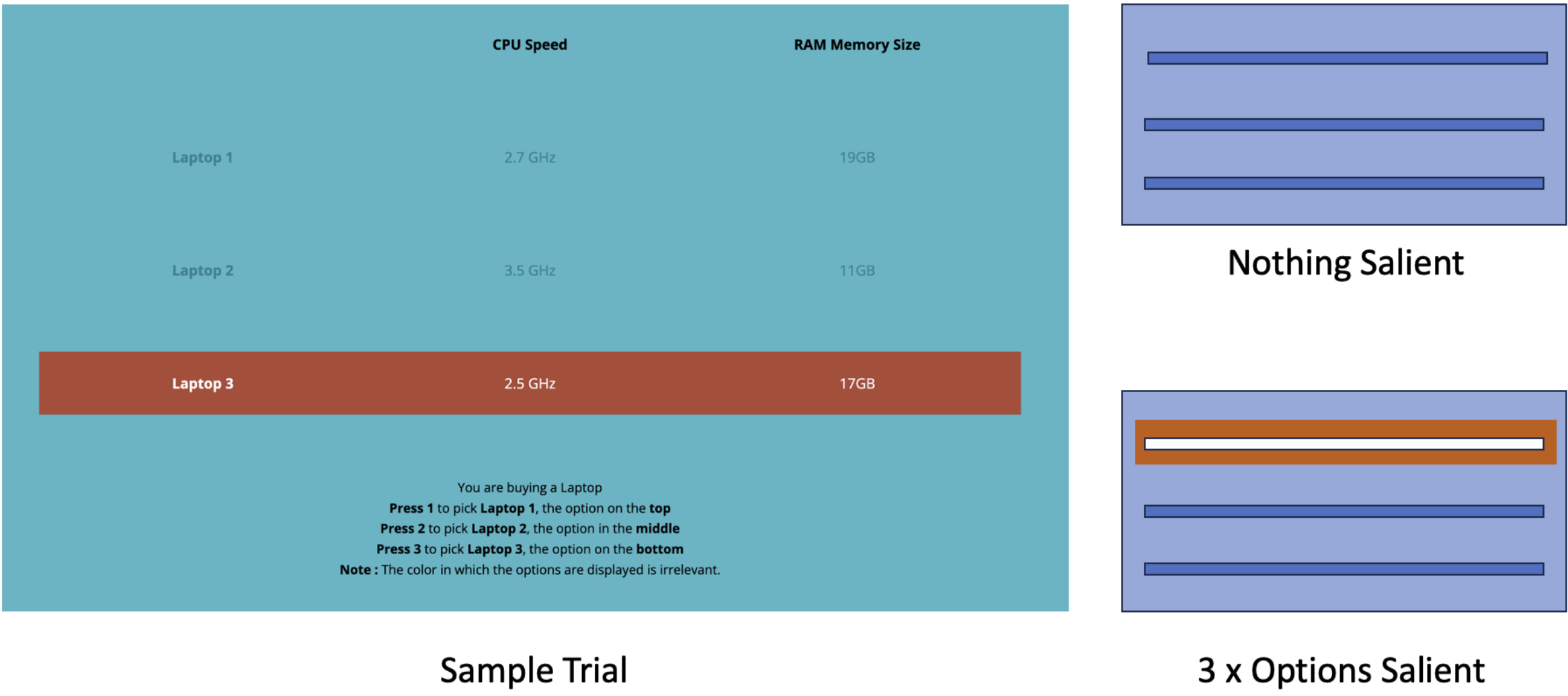


Figure 1. The left panel shows a sample trial. The right panel depicts the different conditions in the experiment.

Hypotheses

- **Hypothesis 1:** Salience creates an Initial Boost for the Preference for the Salient Option
- **Hypothesis 2:** Salience Boosts the Probability of Making Comparisons with the Salient Option

Behavioral Results

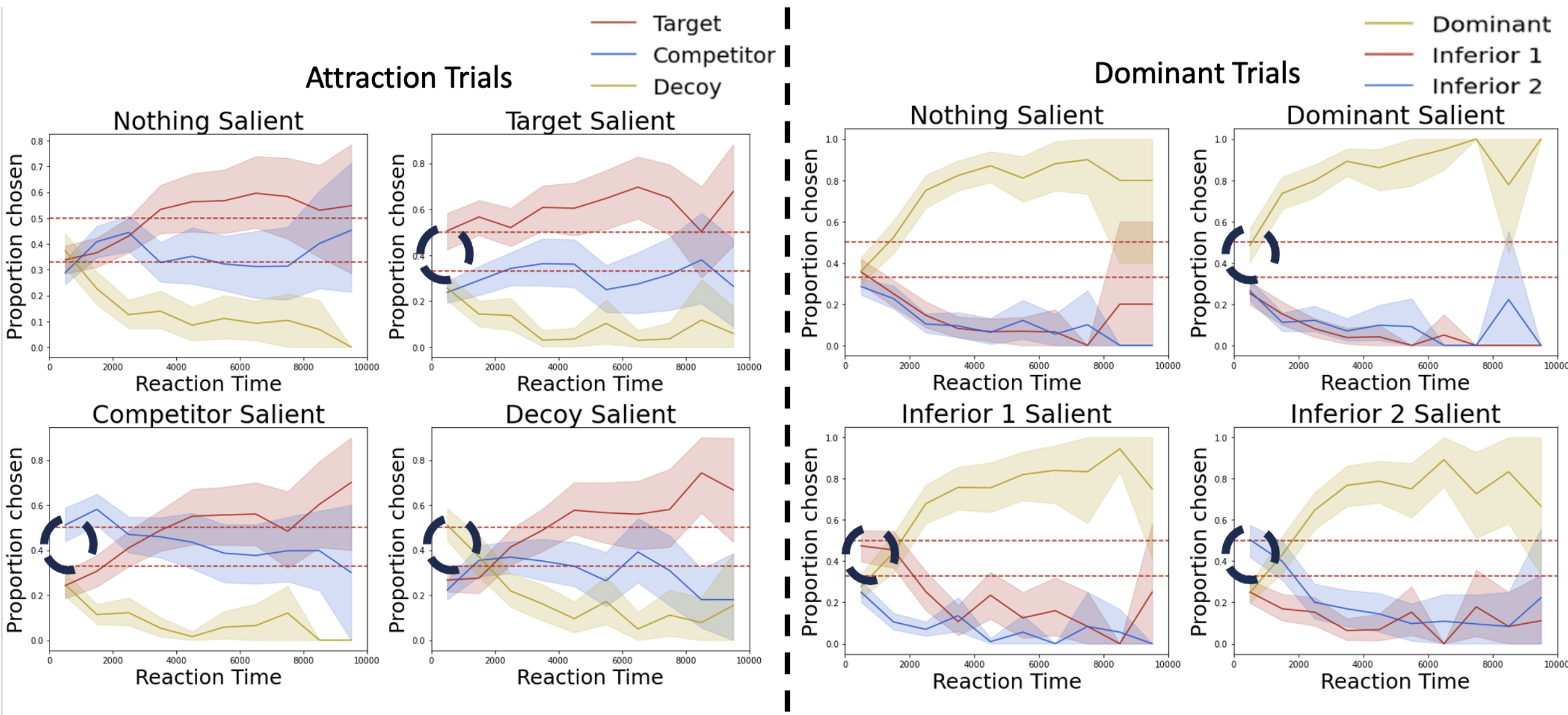


Figure 2. Reaction time and choice. In the all the panels, we observe an initial bias to pick the salient option.

Modeling Methods

To evaluate both hypotheses simultaneously, we employ the 'Full Model'. For Hypothesis 1, we use the 'Initial Boost Only' model. Hypothesis 2 is tested with the 'Comparison Boost Only' model. These are all contrasted against a baseline model that does not incorporate either of these processes.

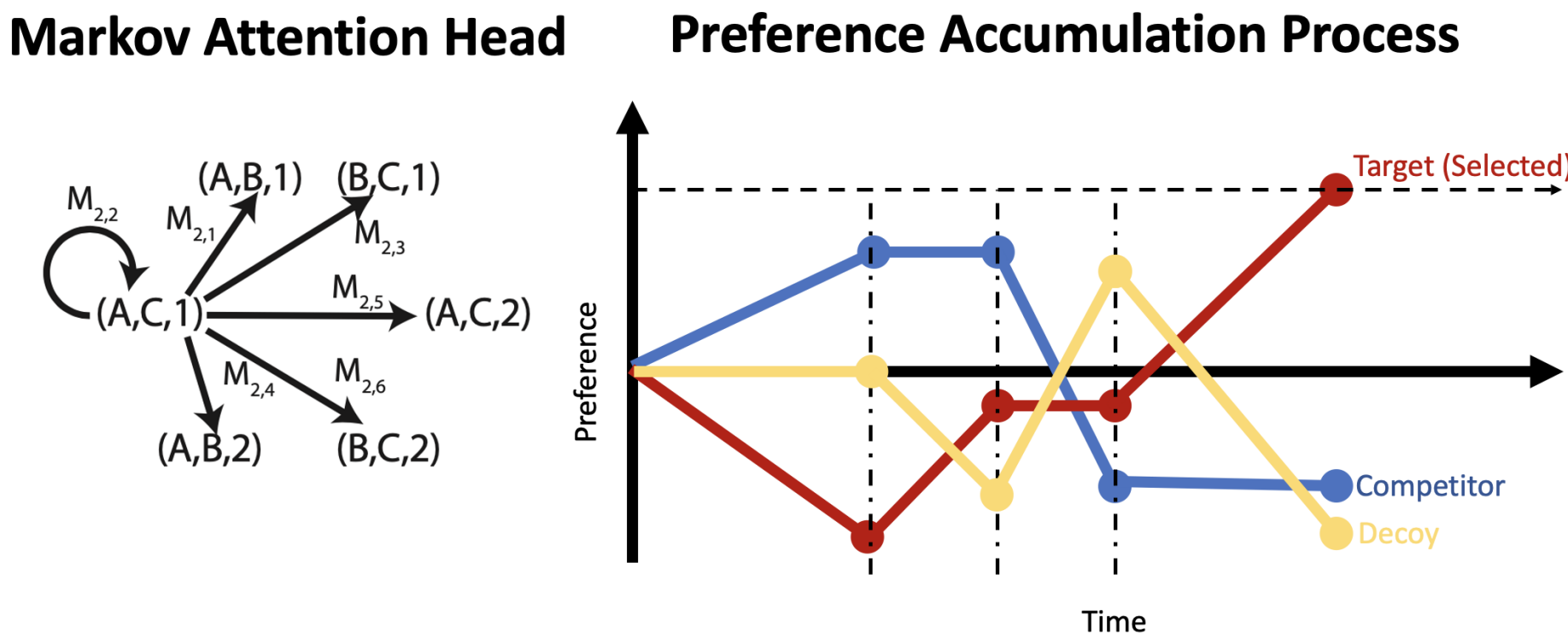


Figure 3. The comparison sampling modeling framework [2] has two components (i) Markov attention process that determines which alternatives and comparisons are being made at each moment in time and (ii) Preference Accumulation that integrates these comparisons until the threshold is crossed.

Model Comparison

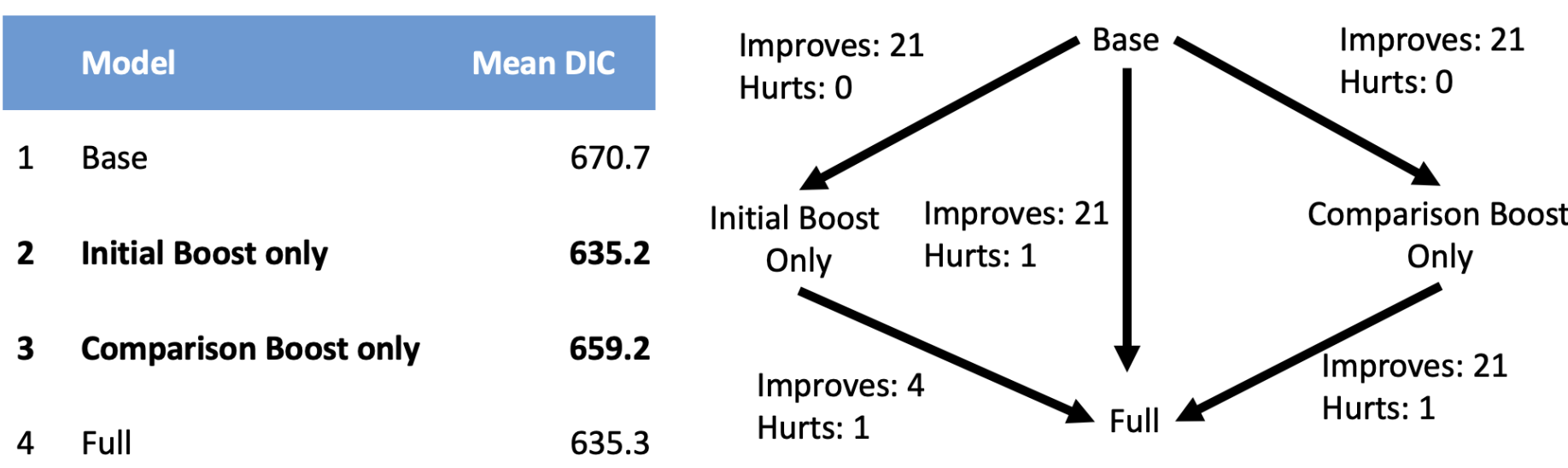


Figure 4. In the left panel, we show the mean Deviance Information Criterion. In the right panel, we show a nested model comparison.

Model Fitting Results

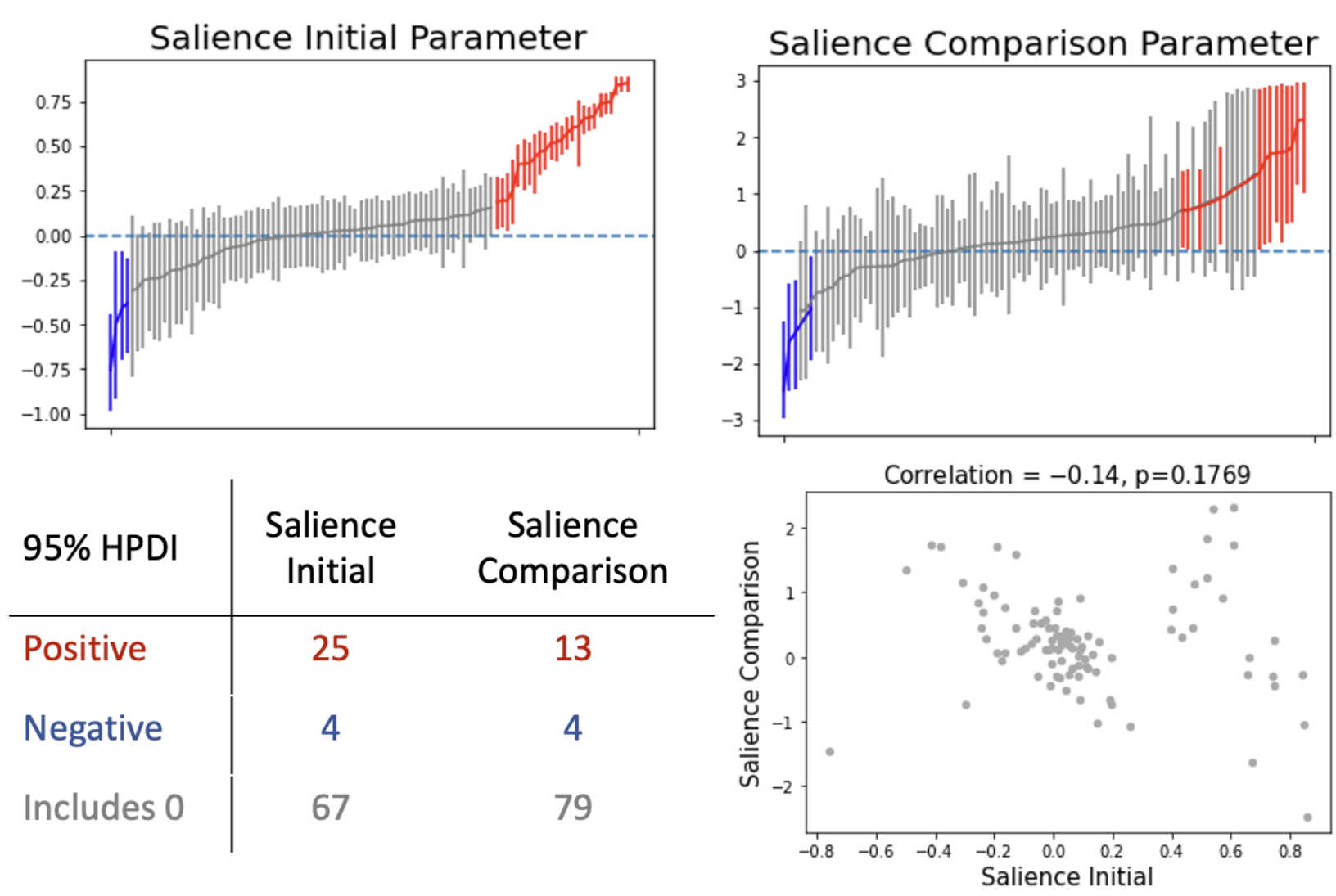


Figure 5. In the top panel, we show the Bayesian Fits for the Full Model. Specifically, we look at the Saliency Initial Parameter (Hypothesis 1) and the Saliency Comparison Parameter (Hypothesis 2). In the bottom left panel, we make inferences at the individual level using the Highest Posterior Density Interval. In the bottom right panel, we show the correlation between the two parameters.

Conclusions

- Examined two mechanisms for how saliency impacts choices using the comparison sampling modeling framework.
- We observed large individual differences
- For many individuals, there was no observable impact of saliency.
- For some individuals, there was evidence of saliency impacting initial bias.

Future Directions

- Individual Difference Measure Correlates.
- Dynamics Manipulations: Speeded Decision Making
- Decision Environment Manipulations
- Visual Attention with Eye Tracking

Acknowledgments

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References

[1] Ian Krajbich and Antonio Rangel. Multialternative drift-diffusion model predicts the relationship between visual fixations and choice in value-based decisions. *Proceedings of the National Academy of Sciences*, 108(33):13852–13857, 2011.

[2] Jennifer Trueblood, Yanjun Liu, Matthew Murrow, William Hayes, and William Holmes. Attentional dynamics explain the elusive nature of context effects. 2022.

[3] Jennifer S Trueblood. Theories of context effects in multialternative, multiattribute choice. *Current Directions in Psychological Science*, 31(5):428–435, 2022.